IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors:	David E. Branson, et al.	Examiner: Leah S. Lovell
Serial No.:	10/002,574	Group Art Unit: 2885
Filed:	November 14, 2001	Docket No.: 10003836-1
Title:	Illumination System for Illuminating a Scan Region of an Object	

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

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Commissioner for Patents
P.O. Box 1450
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Sir:

This Appeal Brief is filed in response to the Final Office Action mailed May 21, 2008 and Notice of Appeal filed on August 21, 2008.

AUTHORIZATION TO DEBIT ACCOUNT

It is believed that no extensions of time or fees are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required (including fees for net addition of claims) are hereby authorized to be charged to Hewlett-Packard Development Company's deposit account no. 08-2025.

I. REAL PARTY IN INTEREST

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

II. RELATED APPEALS AND INTERFERENCES

There are no known related appeals, judicial proceedings, or interferences known to Appellants, the Appellants' legal representative, or assignee that will directly affect or be directly affected by or have a bearing on the Appeal Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1 – 20 are pending in the application and stand finally rejected. The rejection of claims 1 – 20 is appealed.

IV. STATUS OF AMENDMENTS

No amendments were made after receipt of the Final Office Action. All amendments have been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The following provides a concise explanation of the subject matter defined in each of the claims involved in the appeal, referring to the specification by page and line number and to the drawings by reference characters, as required by 37 C.F.R. § 41.37(c)(1)(v). Each element of the claims is identified by a corresponding reference to the specification and drawings where applicable. Note that the citation to passages in the specification and drawings for each claim element does not imply that the limitations from the specification and drawings should be read into the corresponding claim element or that these are the sole sources in the specification supporting the claim features.

Claim 1

An illumination system for illuminating a scan region on an object (Fig. 1 shows an illumination system 10: p. 4, line 30 to p. 5, line 4.), comprising:

a hollow reflector (Fig. 2, #24) having an interior reflective surface (Fig. 2, #26) and an exit aperture (Fig. 2, #28) formed in a body (Fig. 4, #48) of the hollow reflector (The illumination system 10 comprises a hollow reflector 24 having an interior reflective surface 26 and an exit aperture 28: p. 5, lines 29-32.);

a light source (Fig. 4, #30) positioned within said hollow reflector and moving along a displacement path (Fig. 1, #22) to illuminate a scan region (Fig. 4, #44) of an object (Fig. 4, #18) that is positioned on a platen (Fig. 4, #16), said light source producing a plurality of light rays, some of the light rays produced by said light source being reflected by the interior reflective surface of said hollow reflector before passing through the exit aperture (The illumination system 10 is moved back and forth underneath a transparent platen 16 along a displacement path 22 to illuminate a scan region 44 on an object 18 positioned on the platen: p. 9, lines 20-28. The interior reflective surface 26 comprises a diffusing reflective surface so that light incident thereon is scattered or diffused over a wide angle to produce a collimated beam of light 42 through the exit aperture 28: p. 5, line 31 to p. 6, line 3; and p. 6, lines 14-16.);

a first reflector (Fig. 2, #34) joined to a first side (Fig. 2, #36) of the exit aperture of said hollow reflector (The illumination system 10 includes a first reflector 34

positioned adjacent a first side 36 of the exit aperture 28 of the hollow reflector 24: p. 6, lines 5-8.); and

a second reflector (Fig. 2, #38) joined to a second side (Fig. 2, #40) of the exit aperture of said hollow reflector, said first and second reflectors being positioned in non-parallel, spaced-apart relation to one another, said first and second reflectors at least partially collimating light passing through the exit aperture of said hollow reflector to form a collimated beam, wherein the hollow reflector is formed to comprise both the interior reflective surface and the first and second reflectors (A second reflector 38 is positioned adjacent a second side 40 of the exit aperture 28 of the hollow reflector 24: p. 6, lines 8-10. The first and second reflectors are positioned in generally non-parallel, spaced-apart relation so that the first and second reflectors 34 and 38 at least partially collimate light passing through the exit aperture 28 to form a collimated beam 42: p. 6, lines 10-16.).

Claim 4

The illumination system of claim 1, wherein the first and second reflectors form a sharp corner (Fig. 4, 76/78) at a junction with the interior reflective surface of said hollow reflector, the sharp corner minimizes scattering and improves collimation of the light rays passing through the exit aperture (The first and second reflectors 34 and 38 are joined to respective first and second sides 36 and 40 of the exit aperture 24 so that sharp corners 76 and 78 , as opposed to a smooth or partially rounded transition, are formed between the first and second sides 36 and 40 of the exit aperture 28 and respective first and second sides 36 and 40. Sharp corners minimize scattering and improve the collimation of light: p. 16, lines 7-16.).

Claim 9

The illumination system of claim 1, wherein said first and second reflectors are coated with a specular reflecting material (The first and second reflectors 34 and 38 may be coated with respective specular reflecting coatings 72 and 74 to provide the desired specular reflecting characteristic: p. 15, lines 3-6.).

Claim 10

An illumination system for illuminating a scan region on an object (Fig. 1 shows an illumination system 10: p. 4, line 30 to p. 5, line 4.), comprising:

a body (Fig. 2, #24) having an interior wall (Fig. 2, #50) defining a generally cylindrically shaped interior reflective surface (Fig. 2, #26), the interior wall of said body also defining a generally elongate axial opening (Fig. 2, #28) therein located at a first radial position on the interior wall of said body (The illumination system 10 comprises a hollow reflector 24 having an interior reflective surface 26 and an exit aperture 28: p. 5, lines 29-32.);

a light source (Fig. 4, #30) illuminating a scan region on an object (Fig. 4, #18) that is positioned on a platen (Fig. 4, #16) and being positioned within the generally cylindrically shaped interior reflective surface defined by said body (The illumination system 10 is moved back and forth underneath a transparent platen 16 along a displacement path 22 to illuminate a scan region 44 on an object 18 positioned on the platen: p. 9, lines 20-28. The interior reflective surface 26 comprises a diffusing reflective surface so that light incident thereon is scattered or diffused over a wide angle to produce a collimated beam of light 42 through the exit aperture 28: p. 5, line 31 to p. 6, line 3; and p. 6, lines 14-16.);

a first reflector (Fig. 2, #34) joined to a first side (Fig. 2, #36) of the elongate axial opening defined by the interior wall of said body (The illumination system 10 includes a first reflector 34 positioned adjacent a first side 36 of the exit aperture 28 of the hollow reflector 24: p. 6, lines 5-8.); and

a second reflector (Fig. 2, #38) joined to a second side (Fig. 2, #40) of the elongate axial opening defined by the interior wall of said body, said first and second reflectors being positioned in non-parallel, spaced-apart relation to one another, said first and second reflectors at least partially collimating light passing through the exit aperture of said hollow reflector to form a collimated beam (A second reflector 38 is positioned adjacent a second side 40 of the exit aperture 28 of the hollow reflector 24: p. 6, lines 8-10. The first and second reflectors are positioned in generally non-parallel, spaced-apart

relation so that the first and second reflectors 34 and 38 at least partially collimate light passing through the exit aperture 28 to form a collimated beam 42: p. 6, lines 10-16.); and

wherein the first and second reflectors form a sharp corner (Fig. 4, 76/78) at a junction with the interior reflective surface of the body, and the sharp corner minimizes scattering and improves collimation of the at least partially collimating light passing through the exit aperture (The first and second reflectors 34 and 38 are joined to respective first and second sides 36 and 40 of the exit aperture 24 so that sharp corners 76 and 78 , as opposed to a smooth or partially rounded transition, are formed between the first and second sides 36 and 40 of the exit aperture 28 and respective first and second sides 36 and 40. Sharp corners minimize scattering and improve the collimation of light: p. 16, lines 7-16.).

Claim 18

An illumination system for illuminating a scan region on an object (Fig. 1 shows an illumination system 10: p. 4, line 30 to p. 5, line 4.), comprising:

hollow reflector means (example means is a hollow reflector shown in Fig. 2, #24) for defining an interior reflecting surface(Fig. 2, #26) and an exit aperture (Fig. 2, #28) formed through a body (Fig. 4, #48) of the hollow reflector means (The illumination system 10 comprises a hollow reflector 24 having an interior reflective surface 26 and an exit aperture 28: p. 5, lines 29-32.);

light source means (example means is a fluorescent lamp Fig. 4, #32) positioned within said hollow reflector means for producing a plurality of light rays as the light source means moves along a displacement path to illuminate the scan region on the object (The illumination system 10 is moved back and forth underneath a transparent platen 16 along a displacement path 22 to illuminate a scan region 44 on an object 18 positioned on the platen: p. 9, lines 20-28. The interior reflective surface 26 comprises a diffusing reflective surface so that light incident thereon is scattered or diffused over a wide angle to produce a collimated beam of light 42 through the exit aperture 28: p. 5, line 31 to p. 6, line 3; and p. 6, lines 14-16.); and

collimating reflector means (example means are first reflector at Fig. 2, #34 and a second reflector at Fig. 2, #38) joined to the exit aperture defined by said hollow reflector

means for at least partially collimating light exiting the exit aperture defined by said hollow reflector means to form a collimated beam, wherein the hollow reflector means is integrally formed to comprise both the collimating reflector means and the interior reflecting surface (The illumination system 10 includes a first reflector 34 positioned adjacent a first side 36 of the exit aperture 28 of the hollow reflector 24: p. 6, lines 5-8. A second reflector 38 is positioned adjacent a second side 40 of the exit aperture 28 of the hollow reflector 24: p. 6, lines 8-10. The first and second reflectors are positioned in generally non-parallel, spaced-apart relation so that the first and second reflectors 34 and 38 at least partially collimate light passing through the exit aperture 28 to form a collimated beam 42: p. 6, lines 10-16. The first and second reflectors 34 and 38 comprise integral portions of the elongated body 48: p. 14, lines 29-30.).

Claim 19

The illumination system of claim 18, wherein said collimating reflector means forms a sharp corner (Fig. 4, 76/78) at a junction with the interior reflecting surface of the hollow reflector means, and the sharp corner minimizes scattering and improves collimation of the at least partially collimating light exiting through the exit aperture (The first and second reflectors 34 and 38 are joined to respective first and second sides 36 and 40 of the exit aperture 24 so that sharp corners 76 and 78 , as opposed to a smooth or partially rounded transition, are formed between the first and second sides 36 and 40 of the exit aperture 28 and respective first and second sides 36 and 40. Sharp corners minimize scattering and improve the collimation of light: p. 16, lines 7-16.).

Claim 20

A method for illuminating a scan region on an object, comprising:

providing a hollow reflector (Fig. 2, #24) having an interior reflecting surface (Fig. 2, #26) and an exit aperture (Fig. 2, #28) formed in a body (Fig. 4, #48) of the hollow reflector (The illumination system 10 comprises a hollow reflector 24 having an interior reflective surface 26 and an exit aperture 28: p. 5, lines 29-32.);

integrally forming the hollow reflector with a collimating reflector (a first reflector at Fig. 2, #34 and a second reflector at Fig. 2, #38) on at least one side of the

exit aperture of the hollow reflector and forming a junction between the collimating reflector and the interior reflecting surface (The illumination system 10 includes a first reflector 34 positioned adjacent a first side 36 of the exit aperture 28 of the hollow reflector 24: p. 6, lines 5-8. A second reflector 38 is positioned adjacent a second side 40 of the exit aperture 28 of the hollow reflector 24: p. 6, lines 8-10. The first and second reflectors 34 and 38 comprise integral portions of the elongated body 48: p. 14, lines 29-30.);

directing a plurality of light rays onto the interior reflecting surface of the hollow reflector, the interior reflecting surface reflecting some of the light rays through the exit aperture in the hollow reflector, the collimating reflector at least partially collimating light exiting the exit aperture in the hollow reflector to form a collimated beam (Fig. 4, #42. The first and second reflectors are positioned in generally non-parallel, spaced-apart relation so that the first and second reflectors 34 and 38 at least partially collimate light passing through the exit aperture 28 to form a collimated beam 42: p. 6, lines 10-16.); and

moving the hollow reflector along a displacement path (Fig. 1, #22) to direct light exiting through the aperture to scan an object (Fig. 4, #18) that is positioned on a transparent platen (Fig. 4, #16: The illumination system 10 is moved back and forth underneath a transparent platen 16 along a displacement path 22 to illuminate a scan region 44 on an object 18 positioned on the platen: p. 9, lines 20-28.).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1 and18 are rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that application regards as the invention.

Claims 1-20 are rejected under 35 USC § 102(e) as being anticipated by USPN 6,249, 368 (Hsu).

VII. ARGUMENT

The rejection of claims 1 – 20 is improper, and Appellants respectfully request reversal of these rejections.

The claims do not stand or fall together. Instead, Appellants present separate arguments for various claims. Each of these arguments is separately argued below and presented with separate headings and sub-heading as required by 37 C.F.R. § 41.37(c)(1)(vii).

Claim Rejections: 35 USC § 112

Claims 1 and 18 are rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that application regards as the invention. These rejections are traversed.

The examiner argues that claims 1 and 18 are indefinite because "[i]t is unclear if the light source/light means is moving alone or if the combination of the light source and reflector are moving along the displaceable path" (see Final OA at p. 2). This argument is incorrect.

Claim 1 is directed to an illumination system and recites hollow reflector having an internal reflective surface. The claim then recites that a light source is positioned within the hollow reflector and moves along a displacement path to illuminate a scan region of an object. Claim 18 recites similar elements.

Figures 2 and 4 show the illumination system 10 with a hollow reflector 24 that has an internal reflective surface 26 and a light source 30 positioned in the hollow reflector. These components form part of the illumination system 10 shown in a scanner device 12 of Fig. 1. The specification describes how the illumination system moves along a displacement path to scan an object:

> The illumination system 10 is mounted to a carriage assembly 20 that is moveably mounted within the housing 14. The arrangement is such that the carriage assembly 20, thus illumination system 10, is moveable back and forth underneath the transparent platen 16, generally along a

> displacement path 22. A carriage drive system (not shown) operatively associated with the carriage assembly 20 moves the carriage assembly 20 back and forth underneath the transparent platen 16 (i.e., along the displacement path 22) to allow the imaging device (not shown) associated with the scanner device 12 to scan the object 18 positioned on the transparent platen 16. (See p. 5, lines 16-28).

To satisfy the requirements of 35 USC § 112, second paragraph, claim recitations must allow one skilled in the art to understand the bounds of the claim when read in light of the specification. *See Exxon Research and Engineering cov United States*, 60 U.S.P.Q. 2d 1272, 1276 (Fed. Cir. 2001). Thus, it is only if "a claim is *insolubly ambiguous*, and no narrowing construction can be properly adopted" can a claim be held as indefinite. *See id.* (Emphasis added). The Federal Circuit has made clear that "[i]f the meaning of a claim is discernable even though the task may be formidable and the conclusions may be one over which reasonable persons will disagree," the claim will be viewed sufficiently clear to avoid indefiniteness. *See id.* Accordingly, Appellants submit that Section 112, second paragraph, does not present an *ipsis verbis* (in identical words) requirement between the specification and the chosen claim terms. The only requirement is that claim terms be discernable. Additionally, the court of Customs and Patent Appeals has expressly warned that "*breath is not to be equated with indefiniteness*, as we have said many times." *See In re Miller*, 169 U.S.P.Q. 597, 600 (C.C.P.A. 1971) (emphasis added). Thus, in summary, if the meaning of a claimed term is discernable, then that claimed term cannot be held as indefinite under Section 112, second paragraph.

Clearly, the hollow reflector and the light source move along the displacement path to illuminate a scan region of an object. One skilled in the art would be able to discern the meaning of these terms in view of the specification.

Claim Rejections: 35 USC § 102(e)

Claims 1-20 are rejected under 35 USC § 102(e) as being anticipated by USPN 6,249, 368 (Hsu). These rejections are traversed.

The claims recite one or more elements not taught in Hsu. Some examples are provided below for different claim groupings separately argued with different sub-headings.

Overview of Claims and Primary Reference (Hsu)

As a precursor to the arguments, Appellants provide an overview of the claims and the primary reference (Hsu). This overview will assist in determining the scope and content of the prior art and in determining that the claims recite one or more elements not taught in Hsu.

Both Hsu and Appellants' patent application endeavor to solve at least the following problem: generate a level of illumination that is substantially uniform along a length of the scan line (see Appellants' application at p. 2, lines 28-30; and Hsu at column 1, lines 44-56). Appellants' patent application and Hsu, however, solve the problem in very different ways. In Hsu, a curved light shade 83 is positioned at the exit aperture to partly block light passing through the exit aperture (see Hsu at column 3, lines 24-33). By contrast, the claims recite first and second reflectors at sides of the exit aperture. These reflectors collimate light passing through the exit aperture. Thus, Hsu uses a curve light shade to block light, and the claims recite reflectors to collimate light.

The examiner argues that ends of the exit aperture in Hsu teach the claimed first and second reflectors that collimate light. This argument is incorrect because Hsu never teaches or even suggests that these ends are reflective. In fact, Hsu appears to teach away from having these ends reflective since Hsu positions light shade 83 (i.e., a light blocker) on one of these ends. **A light blocker is not a reflector**.

Sub-Heading: Claim 1

As one example, claim 1 recites an illumination system having a hollow reflector with a light source positioned in the hollow reflector. The claim then recites first and second reflectors joined to respective first and second sides of an exit aperture of the hollow reflector. Hsu does not teach the claim elements of first and second reflectors.

In the Final OA at p. 4, the examiner has drawn a modified version of Fig. 5 in Hsu. Here, the examiner argues that the hollow reflector 81 in Hsu has first and second reflectors. This argument is incorrect because Hsu does not teach that the surfaces noted by the examiner are reflective. In other words, the examiner is modifying Hsu, but such modifications are not supported in the teachings of Hsu itself. Nowhere does Hsu teach or even suggest that these surfaces are reflectors.

Anticipation under section 102 can be found only if a single reference shows exactly what is claimed (see *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985)). For at least these reasons, the claims are allowable over Hsu.

As another example, claim 1 recites that the first and second reflectors "at least partially collimating light passing through the exit aperture of said hollow reflector to form a collimated beam." Hsu does not teach this recitation. The examiner argues that Hsu teaches this recitation at column 3, lines 11-23. Appellants respectfully disagree.

Column 3, lines 11-23 in Hsu is directed to Fig. 6. This figure shows light being reflected from the interior surface of the lamp socket 81. Notice that nowhere does Hsu even show that light hits or reflects from the ends of the lamp socket (i.e., the ends that the examiner argues are the claimed first and second reflective surfaces). Instead, Fig. 6 in Hsu shows the light being emitted in a parallel fashion outwardly and away from the lamp tube 82. These parallel beams of light actually would miss the ends of the lamp socket.

Even assuming *arguendo* that the ends of the lamp sock reflect light (which they do not), Hsu still does not teach the elements of claim 1. Specifically, claim 1 recites that the first and second reflectors collimate light to form a collimated beam. Hsu never states or even suggests that the ends noted by the examiner somehow collimate light. To collimate light, Hsu positions light shade 83 (i.e., a light blocker) on one of these ends. If

the ends of Hsu collimated light (as argued by the examiner), then Hsu would have no need for the light shade 83.

For a prior art reference to anticipate under section 102, every element of the claimed invention must be identically shown in a single reference (see *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990)). For at least these reasons, the claims are allowable over Hsu.

Sub-Heading: Claims 4 and 19

Claim 4 is selected for discussion.

Claim 4 recites that the first and second reflectors form a sharp corner that "minimizes scattering and improves collimation of the light rays passing through the exit aperture." Hsu does not teach this recitation. **The examiner does not cite a location in Hsu for teaching this recitation**. Instead, the examiner argues that "it is clear that the sharp corners would minimize scattering and improve collimation of the light rays passing there through" (see Final OA at p. 5). Appellants strongly disagree.

The position of the examiner is not actually taught in Hsu. In Hsu, a curved light shade 83 is positioned at the exit aperture to partly block light passing through the exit aperture (see Hsu at column 3, lines 24-33). Nowhere does Hsu teach or even suggest that corners minimize scattering and improve collimation.

For a prior art reference to anticipate under section 102, every element of the claimed invention must be identically shown in a single reference (see *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990)). For at least these reasons, claims 4 and 19 are allowable over Hsu.

Sub-Heading: Claim 9

Claim 9 recites that the first and second reflectors are coated with a specular reflecting material. The examiner argues that Hsu teaches this element a column 3, lines 11-12. Appellants respectfully disagree.

Column 3, lines 11-12 in Hsu states that the internal surface of the trough is coated with a reflective layer. Hsu never teaches that the ends are also coated. The ends in Hsu would not be coated since these ends are not used to collimate light.

CONCLUSION

In view of the above, Appellants respectfully request the Board of Appeals to reverse the Examiner's rejection of all pending claims.

Any inquiry regarding this Amendment and Response should be directed to Philip S. Lyren at Telephone No. 832-236-5529. In addition, all correspondence should continue to be directed to the following address:

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VIII. Claims Appendix

1. An illumination system for illuminating a scan region on an object, comprising:

a hollow reflector having an interior reflective surface and an exit aperture formed in a body of the hollow reflector;

a light source positioned within said hollow reflector and moving along a displacement path to illuminate a scan region of an object that is positioned on a platen, said light source producing a plurality of light rays, some of the light rays produced by said light source being reflected by the interior reflective surface of said hollow reflector before passing through the exit aperture;

a first reflector joined to a first side of the exit aperture of said hollow reflector; and

a second reflector joined to a second side of the exit aperture of said hollow reflector, said first and second reflectors being positioned in non-parallel, spaced-apart relation to one another, said first and second reflectors at least partially collimating light passing through the exit aperture of said hollow reflector to form a collimated beam, wherein the hollow reflector is formed to comprise both the interior reflective surface and the first and second reflectors.

2. The illumination system of claim 1, wherein said hollow reflector has open ends that provide an inlet for air to enter interior regions of the hollow reflector.

3. The illumination system of claim 1, wherein the first and second reflectors comprise integral portions of the hollow reflector.

4. The illumination system of claim 1, wherein the first and second reflectors form a sharp corner at a junction with the interior reflective surface of said hollow reflector, the sharp corner minimizes scattering and improves collimation of the light rays passing through the exit aperture.

5. The illumination system of claim 1, wherein the illumination system is mounted to a carriage that moves along the displacement path to illuminate the scan region on the object.

6. The illumination system of claim 1, wherein said first reflector comprises a generally flat reflective surface.

7. The illumination system of claim 1, wherein said second reflector comprises a generally flat reflective surface.

8. The illumination system of claim 1, wherein said first and second reflectors comprise specular reflecting surfaces.

9. The illumination system of claim 1, wherein said first and second reflectors are coated with a specular reflecting material.

10. An illumination system for illuminating a scan region on an object, comprising:

a body having an interior wall defining a generally cylindrically shaped interior reflective surface, the interior wall of said body also defining a generally elongate axial opening therein located at a first radial position on the interior wall of said body;

a light source illuminating a scan region on an object that is positioned on a platen and being positioned within the generally cylindrically shaped interior reflective surface defined by said body;

a first reflector joined to a first side of the elongate axial opening defined by the interior wall of said body; and

a second reflector joined to a second side of the elongate axial opening defined by the interior wall of said body, said first and second reflectors being positioned in non-parallel, spaced-apart relation to one another, said first and second reflectors at least partially collimating light passing through the exit aperture of said hollow reflector to form a collimated beam; and

wherein the first and second reflectors form a sharp corner at a junction with the interior reflective surface of the body, and the sharp corner minimizes scattering and improves collimation of the at least partially collimating light passing through the exit aperture.

11. The illumination system of claim 10, wherein the first and second reflectors comprise integral portions of the body.

12. The illumination system of claim 10, wherein said first reflector comprises a flat reflective surface.

13. The illumination system of claim 10, wherein said second reflector comprises a flat reflective surface.

14. The illumination system of claim 10, wherein a length of the body is co-extensive with a length of a scan line within the scan region.

15. The illumination system of claim 10, wherein the body is formed to comprise both the interior reflective surface and the first and second reflectors.

16. The illumination system of claim 10, wherein said first and second reflectors comprise specular reflecting surfaces.

17. The illumination system of claim 10, wherein said first and second reflectors are coated with a specular reflecting material.

18. An illumination system for illuminating a scan region on an object, comprising:

hollow reflector means for defining an interior reflecting surface and an exit aperture formed through a body of the hollow reflector means;

light source means positioned within said hollow reflector means for producing a plurality of light rays as the light source means moves along a displacement path to illuminate the scan region on the object; and

collimating reflector means joined to the exit aperture defined by said hollow reflector means for at least partially collimating light exiting the exit aperture defined by said hollow reflector means to form a collimated beam, wherein the hollow reflector means is integrally formed to comprise both the collimating reflector means and the interior reflecting surface.

19. The illumination system of claim 18, wherein said collimating reflector means forms a sharp corner at a junction with the interior reflecting surface of the hollow reflector means, and the sharp corner minimizes scattering and improves collimation of the at least partially collimating light exiting through the exit aperture.

20. A method for illuminating a scan region on an object, comprising:

providing a hollow reflector having an interior reflecting surface and an exit aperture formed in a body of the hollow reflector;

integrally forming the hollow reflector with a collimating reflector on at least one side of the exit aperture of the hollow reflector and forming a junction between the collimating reflector and the interior reflecting surface;

directing a plurality of light rays onto the interior reflecting surface of the hollow reflector, the interior reflecting surface reflecting some of the light rays through the exit aperture in the hollow reflector, the collimating reflector at least partially collimating light exiting the exit aperture in the hollow reflector to form a collimated beam; and

moving the hollow reflector along a displacement path to direct light exiting through the aperture to scan an object that is positioned on a transparent platen.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.